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Note on the Determination of the Wire-Intervals for a Transit Instrument. By W. H. M. Christie.

In the ordinary use of a transit instrument, the transits of stars are observed over the whole system of wires (say 9 or more), and the instrumental errors (collimation in particular) are referred to the central wire, so that the wire-intervals are required mainly to refer the mean of the wires to the central wire with a high degree of accuracy.

A ready method of doing this independently of star transits is to compare the direct and reflected images of each pair of wires (reckoned from the centre), the small asymmetry of each pair, relatively to the central wire, being measured by the micrometer.

Thus, with a system of 9 wires, the observations would be arranged as follows:—

Wire.	Wire.	Wire.	Wire.
1D 9R	5D 5R	5D 5R	9D 1R
2D 8R	5D 5R	5D 5R	8D 2R
3D 7R	5D 5R	5D 5R	7D 3R
4D 6R	5D 5R	5D 5R	6D 4R

—the reflected image in each case being brought into coincidence (or contact on alternate sides) with the direct image.

Thus the interval between the central wire and the mean of the other 8 wires is determined with the full weight of eight observations; and as the distances between the direct and reflected images of the pairs of wires are very small, the result is practically independent of errors of the micrometer screw. A moderate number of determinations made in this way should suffice to reduce complete transits to the central wire.

For incomplete transits of quick-moving stars, the interval of each wire from the centre wire is required with an accuracy which should be several times greater than that of a single observation, any error in the adopted wire-interval being in this case accidental, and not systematic. A few transits of close circumpolars, or a very moderate number of transits of quick-moving stars, would amply suffice for this.

For close circumpolar stars observed on wires other than the centre wire, it would, of course, be necessary to determine the wire-interval from the centre wire with an accuracy considerably exceeding that of the observation; and for such cases, when they occur, special provision would have to be made.

The great bulk of transits observed would be covered by the method explained above.

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The Places of Zodiacal Stars for the Epoch 1900.

By A. M. W. Downing, D.Sc., F.R.S.

Some years ago the project was formed of constructing a catalogue of zodiacal stars, from all available sources, that would serve, for a decade or so, for such purposes as the supply of sufficiently accurate places of a large number of stars liable to occultation by the Moon, and of stars suitable as Moon-culminators. This catalogue (hereinafter called the Zodiacal Catalogue) was published in its completed form in 1905, as vol. viii. part iii. of the *Astronomical Papers of the American Ephemeris and Nautical Almanac*, under the title of "Catalogue of Zodiacal Stars for the Epochs 1900 and 1920, reduced to an absolute system." As it is fairly complete to magnitude 7·0, and contains a good many stars fainter than 7·0, the catalogue, as thus described, may appear to be rather an ambitious undertaking. Accordingly, I have been glad to avail myself of the opportunity offered by the publication of the *Cape General Catalogue for* 1900 (part i. of which gives the places of 1265 of our 1607 zodiacal stars) to utilise it for the purpose of checking the general accuracy of the Zodiacal Catalogue at the initial epoch.

The Zodiacal Catalogue is reduced to the system of Newcomb's Fundamental Catalogue, and contains all the suitably placed stars in the latter (211 in number), with their places unchanged. The Cape Catalogue is also reduced to Newcomb's system, both in right ascension and in declination, and, in addition, the right ascensions are corrected for personality depending on magnitude. As the Cape places are printed without inclusion of the proper motions, I have applied, in all cases, the effects of the proper motions given in the Zodiacal Catalogue to the Cape places. Only some 50 stars in the Zodiacal Catalogue have no proper motions assigned to them.

It was decided to reject differences between the catalogues amounting to, or greater than, $0^{s}\cdot2$ in right ascension and $3''$ in declination. The adoption of this criterion resulted in the exclusion of 8 right ascensions and 3 declinations of the Zodiacal Catalogue from the comparison. No Newcomb star has been excluded. A case of discordance in the right ascension of *β Virginis* was traced to an error in the Cape Catalogue, where the seconds of right ascension should be $29^{s}\cdot274$, in place of $29^{s}\cdot082$.

The means of the residuals without regard to sign for three hourly groups of catalogue differences, taken at random, are then found to be $^{s}\cdot030$ and $''\cdot45$ in right ascension and declination respectively for the complete comparison, including the Newcomb stars; and $^{s}\cdot019$ and $''\cdot31$ in right ascension and declination for the Newcomb stars.

The differences between the catalogue places have been combined in groups extending over one hour of right ascension. As the stars here dealt with are all ecliptic stars, it is not possible to separate discordances depending on right ascension from those depending on

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